



Endogenous Money: Implications for the Money Supply Process, Interest Rates, and Macroeconomics

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Abstract

Endogenous money represents a mainstay of Post Keynesian (PK) macroeconomics. Analytically, it provides a critical linkage between the financial and real sectors, with the link running predominantly from credit to money to economic activity. The important feature is credit is placed at the beginning of this sequence, which contrasts with conventional representations that place money first.

The origins of PK endogenous money lie in opposition to monetarism. Whereas neo-Keynesian economics challenged monetarism by focusing on the optimality of money supply versus interest rate targets, PK theory challenged monetarism's description of the money supply process.

PK theory is itself divided between "horizontalist" and "structuralist" approaches to the money supply. Horizontalists believe the behavior of financial institutions is unconstrained by the availability of liquidity (reserves) provided by the central bank and the supply-price of finance to banks is fixed at a price set by the central bank. Structuralists believe liquidity pressures matter and the supply price of finance to banks can increase endogenously.

Horizontalists can be further sub-divided into "strong" and "weak" positions. The strong position holds the bank loan supply schedule is horizontal and interest rates are unaffected by lending. The weak position holds that interest rates may rise with lending if borrower quality deteriorates.

The PK debate has been useful in articulating the mechanics of the money supply process, but inadequate attention has been paid to the implications of endogenous money for interest rate determination, the business cycle, and economic growth.

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I Introduction

Endogenous money represents a mainstay of Post Keynesian (PK) macroeconomics, and the PK theory of endogenous money constitutes a significant contribution to macroeconomic theory. Analytically, it provides a critical link connecting the financial and real sectors.

PK endogenous money theory emphasizes that this linkage runs predominantly from credit to money to economic activity. The important feature is that credit is placed at the beginning of this sequence. This contrasts with conventional representations that place money first, as reflected in the standard textbook money multiplier story in which bank deposits are said to create loans.

II Against monetarism: the origins of PK endogenous money theory

The initial impulse for PK endogenous money theory was Kaldor's (1970, 1982) critique of monetarism. This critique built on Kaldor's long history of interest in credit, going back to his engagement with the 1959 Radcliffe Commission that reported on the workings of the British monetary system.

The main claims of monetarism (see Palley, 1993a), as developed by Milton Friedman, are that 1) the money supply is controlled by central banks; 2) the Great Depression was due to a mistaken tightening of the money supply by the U.S. Federal Reserve; 3) money is all that matters and fiscal policy is ineffective; and 4) central banks should adopt a simple money supply growth rule that would promote economic stability.

The roots of PK endogenous money theory lie in opposition to monetarism, both as a theory of macroeconomics and as a policy prescription. The cornerstone of monetarism is that central banks control the money supply, effectively making the money

supply exogenous. The neo-Keynesian response to monetarism was framed in terms of targets and instruments (Poole, 1970) and under what conditions central banks should target the money supply versus interest rates. PKs sought a deeper critique of monetarism centered on a different construction of the money supply process.

III The money supply process: competing approaches

The focus of PK endogenous money theory is the mechanics of the money supply process. In this regard, it is useful to distinguish between historical approaches to endogenous money versus the mechanics of endogenous money within the current system. This distinction is represented in Figure 1.¹

Historical endogeneity is rooted in the German historical school of economics, epitomized by Menger (1892). It is common to both PKs and mainstream economists. The former tend to adopt a discrete “stages of development” approach that describes the evolution of monetary arrangements (Chick, 1992). The latter talk of the competitive evolution of monetary arrangements (Selgin and White, 1987), emphasizing how modern banking systems are the result of profit seeking and competitive market forces in combination with state intervention establishing central banks and a legal monopoly of government issued fiat money.

The current paper focuses on theoretical controversies surrounding money supply determination in modern banking systems. Figure 2 shows the competing theoretical approaches to the modern money supply process. PKs are split between “accommodationists” and “structuralists”, a distinction attributable to Pollin (1991).

Another PK distinction, attributable to Moore (1988), is between “horizontalists”

¹ Palley (2000) provides a survey of the different forms of money supply endogeneity.

and “verticalists”. Horizontalists are equivalent to accommodationists, while verticalists are identified with monetarism. Seen in this light, the horizontalist - verticalist distinction captures two extremes of the debate.

Figure 2 represents the mainstream approach to the money supply as divided between the neo-Keynesian ISLM School and monetarists. Though mainstream economics no longer subscribes to the ISLM framework as a complete model of the macro economy, it still adheres to the ISLM representation of the money supply process in terms of the money multiplier.

Structuralist PKs are positioned next to ISLM neo-Keynesians in Figure 2. This positioning reflects the fact that structuralists have close affinities with the 1960s Yale school of economics developed by James Tobin (Brainard and Tobin, 1968; Tobin, 1969, 1982) that built on the ISLM model, expanding its menu of financial assets. The structuralist position is highly compatible with the Yale school. The important difference is that structuralists emphasize the role of bank lending in determining the money supply, a feature that was absent in Yale school models.

IV Horizontalism/accomodationism vs. structuralism: an overview

Debate between horizontalism/accomodationism (hence forth horizontalism) and structuralism has dominated the PK literature on endogenous money. The benefit of this debate has been that it has helped articulate the microeconomic details of the money supply process. The cost has been that it has become a cul-de-sac that has trapped the PK debate.

The central differences between horizontalists and structuralists concern (1) the factors going into the determination of the complex of interest rates and asset prices, (2)

the behavior of financial institutions and whether they are constrained by availability of liquidity (reserves) provided by the central bank, and (3) the supply price of finance to banks. Structuralists believe liquidity pressures matter and banks face a rising supply price of finance. Horizontalists believe liquidity pressures do not matter and the supply of finance to banks is infinitely elastic at a price set by the central bank.

One reason why the PK debate has become trapped is that the nature of horizontalism was initially unclear, and it is worth splitting horizontalism into “strong” and “weak” versions as shown in Figure 3. Strong horizontalism is principally identified with Moore (1988a, 1989) and treats the bank loan supply schedule as horizontal.² Weak horizontalism can be identified with Wray (1989, 1991) and allows the bank loan supply schedule to be positively sloped.³ According to Wray, bank loan interest rates can rise with lending owing to changes in the risk characteristics of borrowers.⁴

This means there is considerable overlap between weak horizontalists and structuralism as both believe the loan supply schedule is upward sloping. However, that in turn means the shape of the loan supply schedule is not adequate for distinguishing

² Moore (1991) refines the strong horizontalist position making the loan supply curve horizontal for the “market period”, defined as the period during which a seller (the central bank) holds its administered price (the short term interest rate) constant. Central banks may then raise rates in response to increased lending giving rise to the appearance of a positively sloped bank loan supply schedule. However, in each market period the loan supply curve is horizontal. Fontana (2003) also emphasizes this.

³ Of all the contributors to the debate, Wray is the most difficult to place as he shares elements in common with the horizontalism of Moore (1988) and the structuralism of Minsky (1957). Thus, Wray (2007) rejects the existence of liquidity constraints on banks while simultaneously emphasizing the dynamic significance of profit seeking by banks that changes market structure. This makes him horizontalist in the short run and structuralist in the long run.

⁴ A Minskyian perspective suggests loan rates might fall over the cycle as confidence builds and risk aversion/liquidity premia fall (Palley. 2008).

between horizontalists and structuralists.⁵ Lastly, it also means weak horizontalists believe the money supply schedule is upward sloping. This superficially parallels the neo-Keynesian LM schedule, though the microeconomic logic is different.⁶

IV Accommodationism/horizontalism vs. structuralism: the details

a) Modeling the financial sector and the determination of interest rates

The first major analytic difference between structuralists and horizontalists concerns the determination of the complex of interest rates and asset prices. Structuralist models (Palley 1987, 1994, 1996a) have long adopted a multi-market equilibrium approach to interest rate and asset price determination. This ties structuralists closely to the Yale School of economics developed by James Tobin in the 1960s (Tobin 1961, 1969, 1982; Tobin and Brainard, 1968). The key innovation that distinguishes Post Keynesian structuralism from the Yale School is the introduction of bank lending.

Within such models the structure of demands for and supplies of financial assets determines interest rates and asset prices. Asset demands depend on portfolio preferences, transactions needs, transactions costs, expectations and the underlying economic environment. Supplies of financial assets respond endogenously to demands, and the pattern of response depends significantly on the stance of monetary policy. Consequently, interest rates and financial asset quantities – including the money supply – depend on a host of structural factors: hence, the label structuralism. The overnight

⁵ I earlier incorrectly (Palley, 1991) thought the shape of the loan supply schedule was a sufficient distinguishing feature.

⁶ The logic is that interest rates rise with lending, and the money supply also rises with lending. Consequently, the money supply rises with interest rates, generating a positively sloped relation between interest rates and the money supply.

interest rate that is set by the central bank is just one of those factors, albeit a critically important one.

In contrast, the horizontalist literature has tended to focus narrowly on the bank loan rate. In strong horizontalist models that loan rate is a fixed mark-up over the central bank's overnight rate. In weak horizontalist models the mark-up can increase as lending expands, giving rise to greater risk that requires a higher mark-up.

Analytically, the important feature of horizontalism is that outcomes in the banking sector are represented as relatively autonomous and independent of outcomes in financial markets more broadly. This leads to ignoring the impact of money demand on financial quantities and interest rates (Moore, 1989), and ignoring how financial sector developments might feedback and affect bank behavior, including interest rates on bank products.

That said, recently there has been a significant convergence of horizontalists (Lavoie, 2006) toward the structuralist modeling position. This convergence was not present at the outset of the structuralist – horizontalist debate in the late 1980s and early 1990. For instance, Lavoie (1992) who is a leading representative of horizontalism makes no mention of the Yale School approach to asset markets in his popular 1992 Post Keynesian textbook. However, it has become a core element of his later joint work with Godley (Godley and Lavoie, 2007).

b) The theory of interest rates

Horizontalist models give tremendous power to central banks to set interest rates. The central bank makes funds available at a fixed rate according to a perfectly elastic supply curve. When this pattern of supply is linked with a microeconomic model of profit

maximizing banks it has strong implications for the term structure of interest rates, which should conform to the expectations theory of the term structure. The economic logic is that banks will seek to arbitrage returns across market periods such that the term structure of interest rates perfectly embodies expectations of the future administered short term interest rate set by central banks.

If the term structure has premiums embedded, banks should go long on bonds. That is they should borrow in the short term market to pay for purchases of bonds, thereby pocketing the embedded premiums. Conversely, if the term structure embeds term discounts, banks should short bonds and purchase short term instruments, thereby capturing the excess return in a portfolio of short term instruments.

Moore (1991) acknowledges that this is an implication of horizontalism. The problem is all the empirical work on the term structure of interest rates (see Shiller, 1990) reports that the term structure of interest rates consistently violates the pure expectations hypothesis.

This means there is something wrong with the horizontalist description of interest rate formation. Moreover, if the term structure violates this logic, then the violation will spill over into pricing of other assets and liabilities held by banks. That is because banks are multi-input multi-output firms that equalize marginal costs and marginal returns across sources and applications of funds (Palley, 1987/88). Presumably, the reason for these violations has to do with bank concerns with liquidity, leverage, and risk. Those concerns should also affect willingness to supply loans and the terms on which loans are supplied.

c) Liquidity pressures and the supply price of finance to banks

The above discussion leads to the second major analytical difference between horizontalism and structuralism, which concerns the question of whether market liquidity pressures impact bank behavior and financial market outcomes. This issue can in turn be viewed as part of a broader question of whether banking firms face a rising supply price of finance as their lending increases.

The horizontalist position is that liquidity is not a constraint on financial institutions as the supply of liquidity is infinitely elastic at a price set by monetary authority. This also means banks' supply price of finance is constant and equal to the price set by the monetary authority. Structuralists disagree and argue that liquidity pressures impact banks, and banks also face a rising supply price of finance.

Before exploring these theoretical arguments it should be noted that there is empirical support for the structuralist position. Borrowed reserves used to be a measure of liquidity pressure, and Palley (1987/88) reports a small but statistically discernible impact of borrowed reserves on the federal funds rate. This impact then indirectly affects commercial banks' prime rate.⁷ Both Palley (1987/88) and Pollin (1991) also report significant substitutability between borrowed and non-borrowed reserves, indicating that bank behavior is responsive to changes in market liquidity conditions.⁸

Additionally, the term structure is again relevant. Thus, it is empirically well established that the term structure of interest rates is not simply determined by expectations of future short term interest rates (Shiller, 1990). Instead, there are term

⁷ In recent years the significance of borrowed reserves has declined as financial markets have changed. Detecting the current interest rate impact of liquidity pressures therefore requires new measures of liquidity pressure.

premiums, they are volatile, and that volatility is inconsistent with the expectations theory of the term structure. That means banks, which price off the term structure, are not simply pricing their longer term loan offerings using a simple fixed mark-up model based on expectations of future settings of the policy interest rate. Instead, other factors are also at work.

With regard to theoretical critiques of the horizontalist position, the first concerns distinguishing individual bank behavior from that of the system. Current central bank policy practice is to target a policy interest rate, and the U.S. also has lagged reserve accounting (LRA) under which banks' required reserves are calculated on the basis of deposits held two weeks prior. In such a regime, the central bank must accommodate large surges in demand for reserves or risk banks being unable to meet their reserve requirements. However, even with this policy regime, an obligation to make reserves available to the system is fundamentally different from individual banks thinking they have a perfectly elastic supply. Thus, individual banks remain concerned about their liquidity positions, as evidenced by their liquidity management activities that accompany bank asset and liability management activities.

Individual banks that are repeatedly short of reserves and obliged to borrow will face adverse rating agency assessments that raise their cost of capital. The financial crisis of 2007 - 08 has shown that banks are concerned about counter-party credit risk, which is impacted by bank liquidity positions. The crisis has also shown that market spreads over the central bank's policy interest rate can vary, and individual banks are even concerned

⁸ In my original comment on Pollin's (1991) paper I was "wrongly" critical of describing borrowed and non-borrowed reserves as substitutes. They are substitutes.

about borrowing from the discount window for fear of being tarred a financial “lemon”. Thus, there are implicit penalty costs to banks from being short of liquidity, which discourages them going short (Palley, 1987/88).

As noted earlier, the issue of liquidity pressures can be viewed as part of a broader question regarding the supply of finance to banking firms. For horizontalists, banks are unconstrained by the supply of finance which is infinitely elastic at a price set by the monetary authority. This horizontalist position is wrong on three counts. First, it ignores the effects of regulation. Second, it ignores the effects of increasing risk on individual banks. Third, it ignores bank portfolio diversification concerns.

With regard to regulation, banks are currently subject to risk based capital requirements that oblige them to back their loans with equity capital. As individual banks expand their lending they must therefore raise additional equity, and the marginal cost of equity capital is widely viewed as rising. This increases banks’ finance costs, and those costs are then passed on to borrowers. This effect is a pure bank finance supply effect.⁹

With regard to increasing risk, banks are themselves borrowers. That means as individual banks increase their lending they too become subject to increasing risk, which gets reflected in a higher cost of borrowing for banks. Once again, this is a pure bank finance supply side effect. Ironically, weak horizontalists (Lavoie, 1996) have invoked exactly this argument to explain why the mark-up charged on bank loans may rise as bank lending increases.

Finally, if banks are themselves risk averse, they may start charging higher rates

⁹ Wray (2007) also points out that capital requirements mean that banks cannot simply accommodate all loan demand as suggested by Moore (1988b), even if that loan demand is creditworthy.

on particular types of loans as their individual loan portfolios become concentrated in a particular sector – for instance, lending to the local construction sector. In this event, though banks’ own external supply price of finance is unchanged, their internalized supply price is higher. Yet again, this is a pure bank supply-side effect that is unrelated to either the riskiness of bank borrowers or the base cost of funds set by the central bank.

d) Interactions between market and policy

The second theoretical argument concerns how policy affects current interest rates. Horizontalist analysis suffers from an overly simplistic formulation of policy that specifies an exogenous policy interest rate rather than representing policy in terms of a policy reaction function or policy rule.¹⁰ This failure to appropriately model policy results in misunderstanding of how policy affects bank behavior and the endogenous money supply and how the market affects policy (Palley, 1996b).

Even under the current LRA regime banks are forward looking and anticipate near-term adjustments in the policy interest rate that change the terms on which liquidity is available. Thus, banks’ expectations of future liquidity conditions affect their current behavior, impacting the willingness and terms on which they make loans.

For instance, consider a mortgage loan from a bank. The available loan rate can vary significantly from day-to-day in response to changing market expectations and sentiments about future interest rates even though the current policy rate (the federal funds rate in the U.S.) is fixed. The implication is sentiment about the future and the

¹⁰ This simplistic construction of policy likely reflects misplaced PK objections to the mainstream practice of framing policy in terms of rules. Additionally, many PKs object to framing of expectations in terms of rational expectations – defined as model or knowledge consistent expectations (Palley, 1993b). That makes it difficult to take into account expectations of future policy that impact behavior today.

central bank's policy rule affects market outcomes and bank behavior. That rule is part of the current market structure, and it can be viewed as a form of inter-temporal reserve supply schedule that can exert restraint on current loan supply conditions and current monetary aggregates.

Additionally, this feedback process whereby the policy interest rate responds to past, current, and expected future market outcomes means that the policy interest rate is not truly exogenous viewed in an inter-temporal context. That challenges the horizontalist position at its core, a point that was originally made by Pollin (1991) and is made again in Pollin (2008).

The horizontalist failure to appropriately conceptualize policy also leads to overlooking how alternative policy regimes might affect bank behavior. The current regime of LRA could readily be replaced by current reserve accounting, which would change bank liquidity behavior. Moreover, if central bank regulators let it be known they disapproved of banks being short of liquidity and having to borrow, that too would change bank behavior and get them to hold more reserves.

In sum, the policy regime determines the terms on which reserves are supplied, now and in the future. That impacts current bank behavior by affecting the size of implicit liquidity shortage penalty costs and by affecting expectations of future interest rates and future liquidity conditions. It also means the policy interest rate is not truly exogenous since policy is responding to market developments.

e) Can central banks target the money supply using the monetary base as policy instrument?

A third analytical disagreement between structuralists and horizontalists (Moore,

1998) concerns whether central banks can target the money supply and whether they can use the monetary base as their policy instrument. Structuralists maintain they can.¹¹ For instance, central banks can readily implement an interest rate reaction function of the following form:

$$(1) \Delta i_{FF} = i(M - M^*) \quad i' > 0$$

Where Δi_{FF} = change in central bank policy interest rate, M = actual money supply, M^* = target money supply. According to equation (1) the central bank raises its policy rate when the actual money supply is above target.¹² In a world of certainty this rule is equivalent to following a monetary base rule of the form

$$(2) \Delta H = H(M - M^*) \quad H' < 0$$

where ΔH = change in the monetary base. The economic logic is that lowering the federal funds interest rate requires expansionary open market interventions that increase the monetary base: hence, the equivalence between the two rules.

In a world of uncertainty and imperfect information about market demand and supply conditions there will be differences between the two rules given by equations (1) and (2). Rule (1) will tend to produce greater unexpected variability of the monetary base as the monetary authority accommodates whatever base is demanded. Rule (2) will tend to produce greater unexpected variability of the federal funds rate as the monetary

¹¹ Lavoie (1996) contains a discussion of interest rate reaction functions of this form, and believes such policy is feasible. However, his discussion overlooks how anticipations of future central bank policy feedback and impact current outcomes, which provides another source of impact on bank loan rates. It is also not clear whether Lavoie thinks the monetary base can be used as the policy instrument.

¹² Under such a rule higher interest rates would decrease loan demand, leading to repayment of loans and reduction of the money supply. Higher interest rates would also lead to substitution out of demand deposits into other bank liabilities, thereby also decreasing the money supply.

authority sets the base and interest rate adjustment then brings demand for base into alignment with supply. Under both rules there will be money supply variation as the money supply is endogenously determined by a host of factors, including principally the demand for bank credit.

Equations (1) and (2) concern money supply targeting. It is also possible for the monetary authority to target the supply of monetary base through a rule given by

$$(3) \Delta i_{FF} = i(H - H^*) \quad i' > 0$$

where H = actual monetary base and H^* = target monetary base. Paralleling the discussion of money supply targeting, in a world of certainty this is equivalent to a rule given by

$$(4) \Delta H = H(H - H^*) \quad H' < 0$$

Once again, if there is uncertainty and imperfect information, rule (3) will produce greater variability of the monetary base and rule (4) will produce greater variability of the federal funds rate. The economic logic is identical to that above in the discussion of money supply targeting.

The important points from the above discussion are that analytically it is operationally feasible to use the monetary base as the instrument of policy, and it is also operationally possible to target the money supply or the monetary base. That means central banks can impose quantity constraints on the system and they can do so using the monetary base as their policy instrument. However, in actuality, central banks do neither because such practice is deemed sub-optimal from a policy standpoint. The critical point is that this choice is due to sub-optimality, not feasibility.

With regard to choice of policy instrument, the federal funds rate is the preferred

instrument because there are presumably larger costs to unexpected interest rate variability than to unexpected monetary base variability. With regard to choice of policy target, the late 1970s – early 1980s monetarist experiment with money supply targeting showed it to produce highly unstable outcomes associated with enormously costly interest rate variability. This is because the relationship between money supply aggregates and interest rates broke down progressively once central banks started targeting the money supply – a phenomenon known as Goodhart’s law (Goodhart, 1975) – making money supply targeting an unproductive and even destructive policy practice.

Goodhart’s law clearly reflects the endogeneity of the money supply, with agents changing portfolio asset demands and methods of transacting and financing in response to the central bank’s practice of targeting the money supply. Thus, it is a complete empirical vindication of the Post Keynesian theory of endogenous money, and a vindication of Kaldor’s (1970, 1982) deep critique of monetarism. That said, the economic logic behind Goodhart’s law is fundamentally structuralist and in the tradition of the Yale school of economics. That is it relies on economic agents making substitutions among asset and financing choices.

Additionally, it is also noteworthy that the recent experience of credit financed asset bubbles has given rise to renewed policy interest in broad measures of liquidity such as M3. Broad monetary aggregates may therefore start to make something of a comeback in setting of monetary policy. However, whereas the mainstream of the economics profession might incorporate such liquidity measures as an additional argument in a Taylor policy rule for interest rates, structuralist Post Keynesians think controlling asset bubbles require additional policy instruments such as asset based reserve requirements

(Palley, 2003, 2006).

Moore (1998) argues that targeting the monetary base is infeasible in the U.S. because of lagged reserve accounting (LRA) by commercial banks that effectively fixes current needs for reserves.¹³ Moore's claim has some merit because LRA makes the demand for base vertical in quantity - interest rate space. Consequently, if the central bank rigidly fixes the supply of base, the market for base might not be able to clear. However, if the shift to money base targeting were announced long in advance, bank behavior would change in anticipation and banks would start holding large reserve cushions. Furthermore, there are alternatives to a LRA regime, and monetary theory should address all policy regimes rather than be constructed on the basis of one particular policy regime. This reveals the significance of the structuralist argument (Palley, 1996b) for factoring in the impact of monetary policy rules on the behavior of the endogenous money supply.

f) The significance of money demand

A final analytical disagreement concerns the significance of money demand, and Moore (1989) has argued that money demand does not matter. That claim is rejected by Goodhart (1989), Palley (1991), and Howells (1995), all of whom show that money demand matters because it affects both the ultimate volume of credit and the matrix of asset prices and interest rates.

VI Confusion or consensus?

The horizontalist – structuralist debate has been marked by considerable confusion owing to lack of appreciation of the distinction between “weak” and “strong”

¹³ LRA have banks calculate current required reserves on the basis of past levels of bank deposits.

horizontalism. This lack of appreciation is evident in the fact that many PK macroeconomic models treat interest rates as exogenously fixed and simply make a broad brush appeal to horizontalism for justification. This is despite the fact that weak horizontalism maintains interest rates change with lending volumes.

Additionally, there has been confusion over whether it is the bank loan supply curve that is horizontal or the supply of finance to banks that is horizontal. It is now becoming clear that it is the supply price of finance to banks that is the decisive point of difference between horizontalism and structuralism. Both approaches can generate a rising loan supply schedule, albeit with the horizontalist explanation nested within the structuralist explanation.

Horizontalism has been more popular among PKs for a collection of variegated reasons. First, the strong horizontalist model developed by Moore (1989) is appealingly simple. The model provides a simple vehicle for communicating the core insights of endogenous money theory. However, it does so by ignoring money demand, the complexities of policy, the endogenous nature of bank behavior, and the existence of asset market spillover effects.

Second, some PKs object to the notion of equilibrium, and they may have opposed structuralist analysis on the grounds that structuralist models inappropriately embed equilibrium through their use of expanded ISLM/Yale School modeling architecture.

While the significance of microeconomic liquidity pressures and the supply price of finance to banks remain contested, there now appears to be a broad shift among PKs toward the structuralist - Yale School approach to modeling financial markets. For

instance, Godley and Lavoie (2007) essentially use Tobin's (1982) general equilibrium framework with a fixed policy interest rate and more detailed stock – flow accounting that includes loan interest payments. That approach to macroeconomic modeling is now being widely adopted by PKs.

Perhaps driven by weariness with the debate, there appears to be a growing sense among Post Keynesians that the distinction between horizontalism and structuralism has become unhelpful. There is some truth in this. When the distinction was first introduced by Pollin (1991) it provided a very helpful over-arching frame for understanding the issue. Back then, there were very clear and significant differences. However, since then horizontalism has significantly morphed into a form of structuralism, particularly regarding (1) its embrace of the Yale School approach to modeling financial markets and (2) recognition of the dynamic implications of profit-seeking behavior by banks for financial innovation.

As this stage there still remain some differences between horizontalists and structuralists, particularly regarding the implications of liquidity pressures for bank behavior and the determination of the supply price of finance for banks. However, it is not clear what significance these microeconomic differences hold for the broader Post Keynesian project. That project is the incorporation of endogenous money into macroeconomics and growth theory, incorporation of endogenous money into the theory of interest rate determination, and articulation of the significance of endogenous money for the conduct of economic policy – particularly monetary policy.

Unless it can be shown that there are important consequences to the remaining differences between horizontalists and structuralists, the distinction should be parked

away. It exists, but it may no longer be important given the convergence that has been achieved.

VI Endogenous money, interest rates, and macroeconomics

The mechanics of the money supply process has been the main focus of PK thinking. Unfortunately, that focus has distracted attention from the macroeconomic implications of endogenous money.

Figure 4 provides a schema for developing an endogenous money macroeconomic research agenda. An important feature of this schema is that it is a loop so that there is no beginning or end. The representation in terms of a loop is intended to capture the idea that the macroeconomic process is affected by the policy regime, and the policy regime in turn responds to the macroeconomic process.

An endogenous money perspective immediately raises concerns with debt since bank lending is an important driver of the money supply. Additionally, it raises questions about the determination of interest rates.

The horizontalist approach represents interest rates as being under the control of the monetary authority. However, the reality is central banks set the overnight money market interest rate that has the greatest influence on short-term bank loan rates. Beyond that there is an array of different interest rates and asset prices, with interest rates varying by term to maturity and degree of credit risk. That raises the question whether endogenous money introduces new theoretical issues regarding the term structure of interest rates and the pricing of commercial bonds of different credit risk? Additionally, does it raise new questions about pricing of equities?

With regard to debt there is the question of how debt impacts aggregate demand,

and how it affects the economy's ability to reach full employment through price and nominal wage adjustment.

Endogenous money is also relevant for business cycle analysis. Recently, there has been much interest in the effects of debt on business cycle but so far little attention has been paid to the specific impact of endogenous money on the cycle. An exception is Palley (1997) who argues endogenous money increases the amplitude of the business cycle.

Lastly, endogenous money is also likely important for growth, providing a monetary mechanism that propels real growth by financing the growth of AD. However, here too there is a dearth of formal analysis, though the work of the French and Italian circuit schools (Gnos, 2006; Realfonzo, 2006) is suggestive of themes and issues. In particular, the circuit school focuses on the need for credit to initially finance production, and the need for credit to realize profits and complete the circuit of production.

VII Conclusion: monetary policy as a monetary collar

The final piece of the analytic loop in Figure 4 concerns policy. It is ironic that the original interest in endogenous money derived from critique of monetarism and its policy prescriptions, yet PK endogenous money theory has had little to say about policy.

Recently there has been some advance in this area (see the symposium in the *Journal of Post Keynesian Economics*, Volume 30, Fall 2007), but there remains a tendency to frame interest rate policy in terms of an exogenous interest rate rather than in terms of a policy regime and feedback rule.

Analytically, the challenge for monetary policy is to fit a monetary collar to the economy that fosters full employment, economic stability, and growth. The system of

financial regulation and the interest rate policy rule constitute the monetary collar: the economy constitutes the neck being collared. One challenge is that the neck size is subject to unexpected changes that are often only recognizable after the fact. A second challenge is that the collar should exert stiffness in response to some types of disturbance, and elasticity in response to others.

Under a commodity standard such as the gold standard, the supply of gold provides the collar. However, the collar lacks elasticity and can strangle the economy in the event of surges in the demand for gold. In a fiat money economy the collar is affected the central bank's policy interest rate, reserve requirements, and regulation of the financial system. However, the collar can be highly elastic because of endogenous money. Moreover, it has become more elastic owing to deregulation and financial innovation that has resulted in more and more of the financial system escaping the net of regulation and reserve requirements. This has created a system of endogenous finance that is broader than endogenous money (Palley, 1996a).

The current system's monetary collar has both public and private components. The public components are the central bank's interest rate policy and the system of regulation. The private components that limit the money supply are the demand for credit, financial institutions' assessment of credit worthiness of borrowers, and the constraints imposed by the balance sheets of individual financial firms. This system can exhibit significant cyclical asymmetries. Thus, in booms it may expand robustly to increased demands for finance, but it is less capable of supporting demand in slumps.

From an endogenous money perspective, the policy challenge is to design a collar that is counter-cyclical and sufficiently responsive to fluctuations in economic activity.

Two critical policy insights follow from the structuralist emphasis on the dynamic profit seeking behavior of financial firms (Minsky, 1957; Wray, 1990). First, interest rate policy needs to be supplemented by quantitative balance sheet regulations such as asset based reserve requirements that collar the financial sector, leaving interest rate policy free to respond to real sector conditions. Second, the regulatory collar needs continuous adjustment in response to financial innovation and changes in the behavior of financial markets and financial institutions.

References

- Chick, V., "The Evolution of the Banking System and the Theory of Saving, Investment and Interest," in P.Arestis and S.C.Dow (eds), *Money, Method and Keynes: selected Essays of Victoria Chick*, London: Macmillan, 193 - 205.
- Fontana, G., "Post Keynesian Approaches to Endogenous Money: A Time Framework Explanation", *Review of Political Economy*, 15 (2003), 291-314.
- Gnos, C., "French Circuit Theory" in P.Arestis and M.Sawyer (eds), *A Handbook of Alternative Monetary Economics*, Cheltenham, UK: Edward Elgar, 2006.
- Godley, W., and M. Lavoie, *Monetary Economics: An Integrated Approach to Credit, Money, Income, Production and Wealth*, London: Palgrave Macmillan, 2007.
- Goodhart, C., "Monetary Relationships: A View from Threadneedle Street," Papers in Monetary Economics, 1, Reserve Bank of Australia, 1975.
- , "Has Moore Become Too Horizontal?" *Journal of Post Keynesian Economics*, 12 (Fall 1989), 29 - 34.
- Howells, P., "The Demand for Endogenous Money," *Journal of Post Keynesian Economics*, 18 (Fall 1995), 89 - 106.
- Kaldor, N., "The New Monetarism," *Lloyds Bank Review*, 97 (1970), 1 – 17.
- , *The Scourge of Monetarism*, Oxford: Oxford University Press, 1982.
- Lavoie, M., "The Endogenous Flow of Credit and the Post Keynesian Theory of Money," *Journal of Economic Issues*, 18 (September 1984), 771 – 97.
- , *Foundations of Post-Keynesian Economic Analysis*, Aldershot: Edward Elgar, 1992.
- , "Horizontalism, Structuralism, Liquidity Preference and the Principle of Increasing Risk," *Scottish Journal of Political Economy*, 43 (August 1996), 275 – 300.
- , "Endogenous Money: Accommodationist" in P.Arestis and M.Sawyer (eds), *A Handbook of Alternative Monetary Economics*, Cheltenham, UK: Edward Elgar, 2006.
- Menger, K., "On the Origin of Money," *Economic Journal*, 2 (1892), 239 – 55.
- Minsky, H.P., "Central banking and Money Market Changes," *Quarterly Journal of Economics*, 71 (May 1957), 171 – 87.

Moore, B.J., *Horizontalists and Verticalists: The Macroeconomics of Credit Money*, Cambridge: Cambridge University Press, 1988.

-----, "The Endogenous Money Supply," *Journal of Post Keynesian Economics*, 10 (Spring 1988b), 372 - 85.

-----, "A Simple Model of bank Intermediation," *Journal of Post Keynesian Economics*, 12 (Fall 1989), 10 – 28.

-----, "Money Supply Endogeneity: Reserve Price Setting or Reserve Quantity Setting," *Journal of Post Keynesian Economics*, 13 (Spring 1991), 404 -13.

-----, "Accommodation to Accommodationism: A Note," *Journal of Post Keynesian Economics*, 21 (Fall 1998), 175 – 78.

Palley, T.I., "Bank Lending, Discount Window Borrowing, and the Endogenous Money Supply: A Theoretical Framework," *Journal of Post Keynesian Economics*, 1987, X (Winter 1987/88), 282-303.

-----, "The Endogenous Money Supply: Consensus and Disagreement," *Journal of Post Keynesian Economics*, 13 (Spring 1991), 397-403.

-----, "Milton Friedman and the Monetarist Counter-Revolution: A Reappraisal," *Eastern Economic Journal*, 19 (Winter 1993a), 71-82.

-----, "Uncertainty, Expectations, and the Future: if we don't know the Answers, what are the Questions?" *Journal of Post Keynesian Economics*, 15 (Fall 1993b), 1-20.

-----, "Competing Theories of the Money Supply: Theory and Evidence," *Metroeconomica*, 45 (1994), 67-88.

-----, *Post Keynesian Economics: Debt, Distribution, and the Macro Economy*, London: Macmillan Press, 1996a.

-----, "Accommodationism versus Structuralism: Time for an Accommodation," *Journal of Post Keynesian Economics*, 18 (Summer 1996b), 585-94.

-----, "Endogenous Money and the Business Cycle," *Journal of Economics*, 65 (1997), 133 - 149.

-----, "Asset Price Bubbles and the Case for Asset Based Reserve Requirements," Challenge, 46 (May – June 2003), 53 – 72.

-----, "Monetary Policy in an Endogenous Money Economy," in P.Arestis and M.Sawyer (eds), *A Handbook of Alternative Monetary Economics*, Cheltenham, UK: Edward Elgar, 2006.

-----, "Macroeconomics Without the LM: A Post Keynesian Perspective," Paper presented at the Post Keynesian Summer School, University of Missouri, Kansas City, June 2008.

Pollin, R., "Two Theories of Money Supply Endogeneity: Some Empirical Evidence," *Journal of Post Keynesian Economics*, 13 (1991), 366 – 96.

-----, "Considerations on Interest Rate Exogeneity: To What Extent Does the Market Determine Rates?" Working Paper 177, Political Economy Research Institute, University of Massachusetts, Amherst, MA, August 2008.

Poole, W., "Optimal Monetary Policy Instruments in a Simple Stochastic Macro Model," *Quarterly Journal of Economics*, 84 (1970), 197 – 216.

Realfonzo, R., "The Italian Circuitist Approach" in P.Arestis and M.Sawyer (eds), *A Handbook of Alternative Monetary Economics*, Cheltenham, UK: Edward Elgar, 2006.

Selgin G. and L.H. White, "The Evolution of a Free Banking System," *Economic Inquiry*, 25 (1987), 439 – 57.

Shiller R.J., "The Term Structure of Interest Rates," in B.M. Friedman and F.H.Hahn (eds), *Handbook of Monetary Economics, Volume 1*, Amsterdam: Nort-Holland, 1990.

Tobin, J., "Money, Capital, and Other Stores of Value," *American Economic Review*, 51 (May 1961), 26 – 37.

-----, "A General Equilibrium Approach to Monetary Theory," *Journal of Money, Credit, and Banking*, 1 (February 1969), 15 – 29.

-----, "Money and Finance in the Macroeconomic Process," *Journal of Money, Credit, and Banking*, 14 (May 1982), 171 - 2004.

Tobin, J. and W. Brainard, "Pitfalls in Financial Model Building," *American Economic Review*, 58 (May 1968), 99 – 122.

Wray, L.R., "Two Reviews of Basil Moore," *Journal of Economic Issues*, 23 (December 1989), 1185 – 89.

-----, *Money and Credit in Capitalist Economies: The Endogenous Money Approach*, Aldershot, UK: Edward Elgar, 1990.

-----, "Boulding's Balloons: A Contribution to Monetary Theory," *Journal of Economic Issues*, 25 (March 1991), 1 – 20.

-----, "Endogenous Money: Structuralist and Horizontalist," Working Paper No. 512, The Levy Economics Institute of Bard College, Annandale-on-Hudson, NY, 2007.

Figure 1. The Money Supply Process

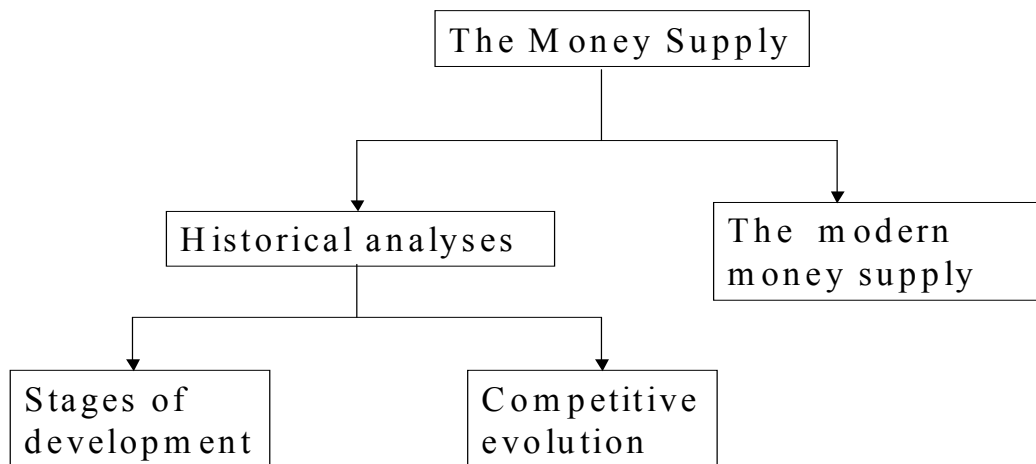


Figure 2. Competing theoretical approaches to the modern money supply process

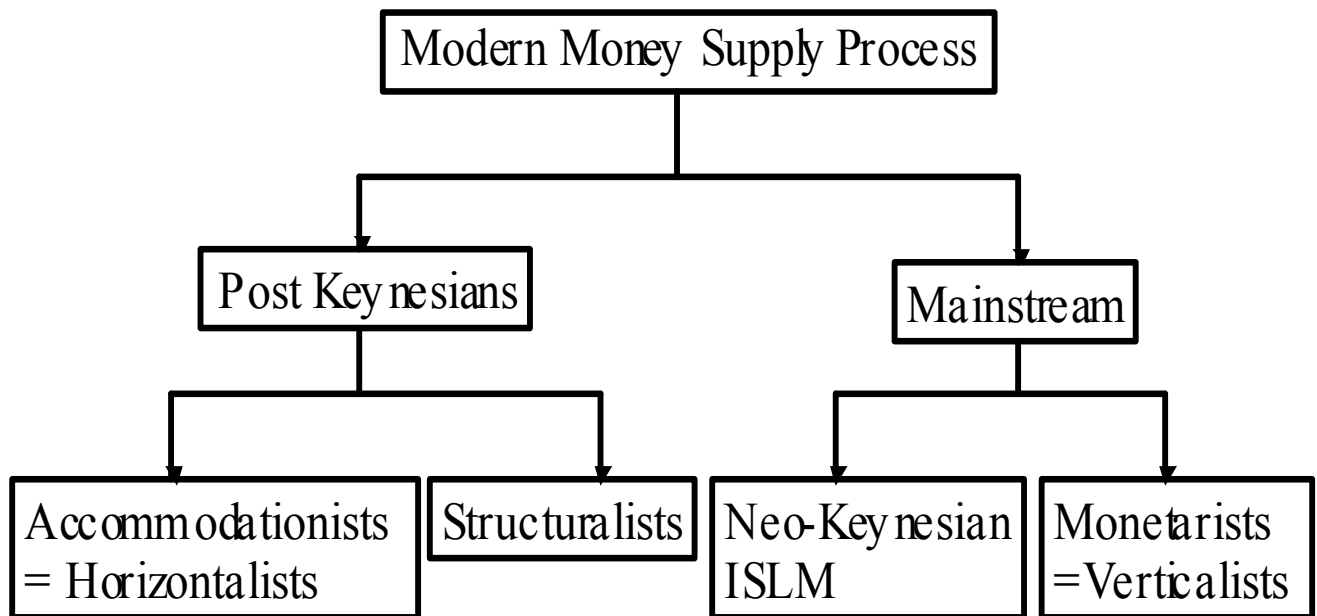


Figure 3. Alternative Post Keynesian approaches to endogenous money.

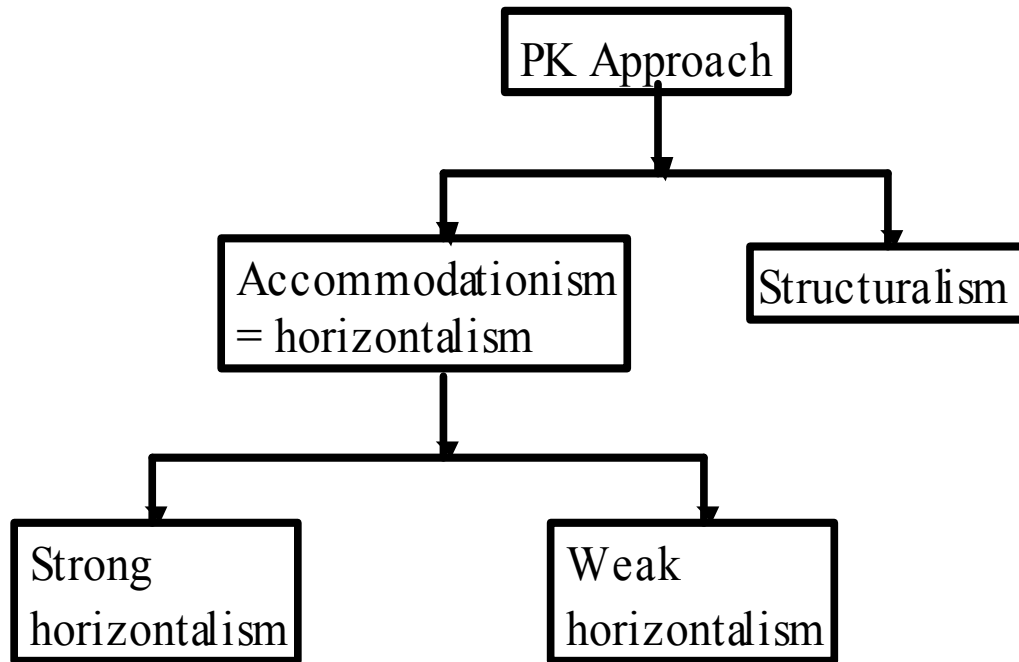


Figure 4. A framework for conceptualizing endogenous money and its relation to macroeconomics.

